



US007780961B2

(12) **United States Patent**
Steidler

(10) **Patent No.:** **US 7,780,961 B2**
(45) **Date of Patent:** **Aug. 24, 2010**

(54) **SELF-CONTAINING *LACTOCOCCUS* STRAIN**
(75) Inventor: **Lothar Steidler**, Bandon (IE)
(73) Assignee: **Actogenix N.V.**, Zwijnaarde (BE)
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 451 days.

6,746,671 B2 * 6/2004 Steidler et al. 424/93.2
7,358,067 B2 4/2008 Vrang et al.
2001/0006642 A1 7/2001 Steidler et al.
2002/0019043 A1 2/2002 Steidler et al.
2003/0202991 A1 10/2003 Steidler et al.
2003/0203472 A1 10/2003 Portnoy et al.
2004/0043003 A1 3/2004 Chen et al.

(21) Appl. No.: **10/687,996**

(22) Filed: **Oct. 17, 2003**

(65) **Prior Publication Data**
US 2005/0101005 A1 May 12, 2005

Related U.S. Application Data
(63) Continuation of application No. PCT/EP02/04942, filed on May 3, 2002.

(30) **Foreign Application Priority Data**
May 3, 2001 (EP) 01201631
Dec. 7, 2001 (EP) 01204785

(51) **Int. Cl.**
A61K 48/00 (2006.01)
C12N 1/21 (2006.01)

(52) **U.S. Cl.** **424/93.2; 435/252.3**

(58) **Field of Classification Search** 435/193,
435/252.3, 320.1; 536/23.2

See application file for complete search history.

(56) **References Cited**
U.S. PATENT DOCUMENTS

4,100,495 A 7/1978 Luvison et al.
4,190,495 A 2/1980 Curtiss, III
4,888,170 A * 12/1989 Curtiss, III 424/200.1
5,032,510 A 7/1991 Kovacevic et al.
5,149,532 A 9/1992 Brunell
5,240,705 A 8/1993 Jacobs
5,330,753 A 7/1994 Mekalanos et al.
5,364,774 A 11/1994 Muir et al.
5,401,642 A 3/1995 Fiers et al.
5,401,658 A 3/1995 Fiers et al.
5,417,986 A 5/1995 Reid et al.
5,455,034 A 10/1995 Nagaraja et al.
5,504,005 A 4/1996 Bloom et al.
5,547,664 A 8/1996 Charles et al.
5,559,007 A 9/1996 Suri et al.
5,591,632 A 1/1997 O'Donnell et al.
5,733,540 A 3/1998 Lee
5,824,538 A 10/1998 Branstrom et al.
5,837,409 A 11/1998 Bertrand et al.
6,100,388 A 8/2000 Casas et al.
6,130,082 A 10/2000 Majarian et al.
6,190,662 B1 2/2001 Steidler et al.
6,190,669 B1 2/2001 Noriega et al.
6,221,648 B1 4/2001 Le Page et al.
6,261,561 B1 7/2001 Stewart, Jr. et al.
6,262,119 B1 7/2001 Ferrante et al.
6,605,286 B2 8/2003 Steidler
6,610,300 B1 8/2003 Segers et al.
6,685,943 B1 2/2004 Hook et al.

FOREIGN PATENT DOCUMENTS

DE 42 31 764 A1 3/1994
EP 0 176 320 4/1986
EP 0 406 003 A1 1/1991
EP 0 449 770 10/1991
EP 0 450 176 10/1991
WO WO 88/06626 9/1988
WO WO 91/06654 5/1991
WO WO 93/17117 9/1993
WO WO 95/03418 2/1995
WO WO 95/10614 4/1995
WO WO 95/10621 4/1995
WO WO 96/11277 4/1996
WO WO 96/32487 A1 10/1996
WO WO 96/40947 12/1996
WO WO 97/14806 4/1997
WO WO 98/31786 7/1998
WO WO 99/58652 11/1999
WO WO 00/01799 1/2000
WO WO 00/23471 4/2000
WO WO 02/090551 A2 11/2002
WO WO 03/096979 A 11/2003
WO WO 2004/045392 A 6/2004
WO WO 2004/046346 6/2004
WO WO 2007/063075 A 6/2007
WO WO 2008/090223 A2 7/2008

OTHER PUBLICATIONS

Steidler et al (Jul. 2003) Nature Biotechnology, vol. 21, No. 7, pp. 785-789.*
Ross et al. (1990) App. Environ. Microbiology, vol. 56, pp. 2156-2163.*
ATCC Catalog Search performed online on Nov. 17, 2009 at www.atcc.org/ATCCAdvanceCatalogSearch/tabid/112/default.aspx.*
Ross, et al., Thymidylate Synthase Gene from *Lactococcus lactis* as a Genetic Marker: an Alternative to Antibiotic Resistance Genes, Applied and Environmental Microbiology, Jul. 1990, pp. 2164-2169, vol. 56, No. 7.
Schotte et al., Secretion of biologically active murine interleukin-10 by *Lactococcus lactis*, Enzyme and Microbial Technology, 2000, pp. 761-765, vol. 27.

(Continued)

Primary Examiner—Rebecca E. Prouty
(74) Attorney, Agent, or Firm—TraskBritt

(57) **ABSTRACT**

The invention relates to a recombinant *Lactococcus* strain, with environmentally limited growth and viability. More particularly, it relates to a recombinant *Lactococcus* that can only survive in a medium, where well-defined medium compounds are present. A preferred embodiment is a *Lactococcus* that may only survive in a host organism, where such medium compounds are present, but cannot survive outside the host organism in the absence of such medium compounds.

24 Claims, 9 Drawing Sheets